Remarks

The Office Action mailed March 23, 2007, and made final, has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 1-20 are now pending in this application. Claims 1-6 stand rejected. Claims 7-20 are newly added. Applicants submit that no additional fee is required for newly added Claims 7-20.

The rejection of Claims 1, 5, and 6 under 35 U.S.C. § 102(e) as being anticipated by Mori (U.S. Patent 6,526,305) is respectfully traversed.

Mori describes a method of creating an image of brain fibers. The method includes exposing the brain fibers to a magnetic resonance imaging process and acquiring diffusion-weighted images that are employed to calculate an apparent diffusion constant at each pixel along more than six axes. The method also includes introducing data into a microprocessor that calculates six variables in a diffusion tensor and obtains a plurality of eigen values and eigen vectors. In a preferred embodiment, the method also includes the initiation of fiber tracking by selecting a pixel for initiation of the same, connecting the pixels and effecting a judgment regarding termination of the pixel tracking in each direction based upon the randomness of the fiber orientation of the adjacent pixels.

Applicants respectfully traverse the assertion in the Office Action that Mori teaches moving grid points randomly and tracking a fiber. Specifically, although Figure 6 of Mori appears to have fibers positioned randomly *in one plane*, Mori does not teach a system that can track a fiber when the fiber density suddenly decreases *in a specific view direction in a 3D volume*. More specifically, Mori does not describe randomly moving grid points based on a distribution function such as a Gaussian distribution or a uniform distribution, as recited in amended Claims 1, 2, and 5. Further, Mori does not describe a system wherein a range of moving is defined such that most of the points after moving fall within intervals between the original location of the grid points, as described in the present invention. Rather, Mori merely describes effecting a judgment regarding termination of pixel tracking in each

direction based upon a randomness of a fiber orientation of adjacent pixels. Applicants submit that merely describing effecting a judgment regarding termination of pixel tracking in each direction based upon a randomness of a fiber orientation of adjacent pixels does not describe or suggest randomly displacing grid points based on a distribution function.

Claim 1 recites a fiber rendering apparatus comprising "a device for specifying a region of interest or volumetric region of interest in three-dimensional image data collected by a diffusion tensor method in an MRI apparatus...a device for defining regular grid points in the region of interest or volumetric region of interest...a device for defining points obtained by randomly moving the grid points based on a distribution function in a two-dimensional or three-dimensional manner as tracking start points...a device for performing diffusion tensor analysis on each tracking start point in the three-dimensional image data to determine a direction of a principal axis vector...a device for tracking a fiber by repeatedly selecting a neighbor point along the direction of the principal axis vector and performing diffusion tensor analysis on the neighbor point to determine a direction of a principal axis vector...a device for producing and displaying an image of the tracked fibers as viewed in a desired view direction."

Mori does not describe or suggest a fiber rendering apparatus as recited in Claim 1. More specifically, Mori does not describe or suggest a fiber rendering apparatus that includes a device for defining points obtained by randomly moving grid points based on a distribution function. Rather, Mori merely describes effecting a judgment regarding termination of pixel tracking in each direction based upon a randomness of a fiber orientation of adjacent pixels.

Accordingly, for at least the reasons set forth above, Claim 1 is submitted to be patentable over Mori.

Claim 5 recites a fiber rendering apparatus comprising "a device for defining tracking start points in three-dimensional image data collected by a diffusion tensor method in an MRI apparatus, wherein the tracking start points are generated by randomly displacing a plurality of grid points located in a region of interest based on a distribution function...a device for

performing diffusion tensor analysis on each tracking start point in the three-dimensional image data to determine a direction of a principal axis vector and eigenvalues of a diffusion tensor...a device for tracking a fiber by repeatedly selecting a neighbor point along the direction of the principal axis vector and performing diffusion tensor analysis on the neighbor point to determine a direction of a principal axis vector and eigenvalues of a diffusion tensor...a device for producing an image of the tracked fibers as viewed in a desired view direction and displaying the image with display colors reflecting the eigenvalues of the diffusion tensors at the tracking start points and neighbor points."

Mori does not describe or suggest a fiber rendering apparatus as recited in Claim 5. More specifically, Mori does not describe or suggest a fiber rendering apparatus that includes a device for defining tracking start points in three-dimensional image data collected by a diffusion tensor method in an MRI apparatus, wherein the tracking start points are generated by randomly displacing a plurality of grid points located in a region of interest based on a distribution function. Rather, Mori merely describes effecting a judgment regarding termination of pixel tracking in each direction based upon a randomness of a fiber orientation of adjacent pixels.

Accordingly, for at least the reasons set forth above, Claim 5 is submitted to be patentable over Mori.

Claim 6 depends from Claim 5. When the recitations of Claim 6 are considered in combination with the recitations of Claim 5, Applicants submit that Claim 6 likewise is patentable over Mori.

For at least the reasons set forth above, Applicants respectfully request that the Section 102 rejection of Claims 1, 5, and 6 be withdrawn.

The rejection of Claims 2-4 under 35 U.S.C. § 103(a) as being unpatentable over Mori in view of Laidlaw et al. (U.S. Patent Application Publication 2003/0234781) (hereinafter referred to as "Laidlaw") is respectfully traversed.

Mori is described above. Laidlaw describes a system for rendering volumetric multivalued primary data. The system includes a rendering engine having an input coupled to a source of multivalued primary data and an output coupled to a display. The rendering engine includes a data processor for calculating additional data values from the primary data, deriving at least one visual representation from the primary data and the additional data values, and mapping the derived visual representation through transfer functions to hardware primitives for volumetrically rendering the derived visual representation to provide a visualization. The system also includes a user interface for interacting with the visualization. Notably, Laidlaw does not describe or suggest a device for defining tracking start points in three-dimensional image data collected by a diffusion tensor method in an MRI apparatus, wherein the tracking start points are generated by randomly displacing a plurality of grid points located in a region of interest based on a distribution function. Rather, Laidlaw is merely cited for displaying an image with opacity values that reflect diffusion anisotropy values. Applicants submit that merely describing displaying an image with opacity values that reflect diffusion anisotropy values does not describe or suggest randomly displacing grid points based on a distribution function.

Claim 2 recites a fiber rendering apparatus comprising "a device for defining tracking start points in three-dimensional image data collected by a diffusion tensor method in an MRI apparatus, wherein the tracking start points are generated by randomly displacing a plurality of grid points located in a region of interest based on a distribution function...a device for performing diffusion tensor analysis on each tracking start point in the three-dimensional image data to determine a direction of a principal axis vector and a diffusion anisotropy value...a device for tracking a fiber by repeatedly selecting a neighbor point along the direction of the principal axis vector and performing diffusion tensor analysis on the neighbor point to determine a direction of a principal axis vector and a diffusion anisotropy value...a device for producing an image of the tracked fibers as viewed in a desired view direction and displaying the image with opacity reflecting the diffusion anisotropy values at the tracking start points and neighbor points."

Neither Mori nor Laidlaw, considered alone or in combination, describes or suggests a fiber rendering apparatus as recited in Claim 2. Specifically, neither Mori nor Laidlaw, considered alone or in combination, describes or suggests a fiber rendering apparatus that includes a device for defining tracking start points in three-dimensional image data collected by a diffusion tensor method in an MRI apparatus, wherein the tracking start points are generated by randomly displacing a plurality of grid points located in a region of interest based on a distribution function. Rather, Mori merely describes effecting a judgment regarding termination of pixel tracking in each direction based upon a randomness of a fiber orientation of adjacent pixels, and Laidlaw merely describes displaying an image with opacity values that reflect diffusion anisotropy values.

Accordingly, for at least the reasons set forth above, Claim 2 is submitted to be patentable over Mori in view of Laidlaw.

Claims 3 and 4 depend from Claim 2. When the recitations of Claims 3 and 4 are considered in combination with the recitations of Claim 2, Applicants submit that Claims 3 and 4 likewise are patentable over Mori in view of Laidlaw.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 2-4 be withdrawn.

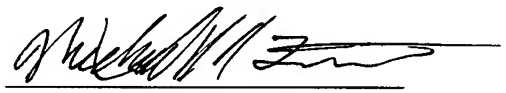
With respect to newly added Claims 7-20, newly added Claims 7-12 depend from independent Claim 1, which is submitted to be patentable over the cited art. When the recitations of Claims 7-12 are considered in combination with the recitations of Claim 1, Applicants submit that Claims 7-12 likewise are patentable over the cited art.

Claims 13-16 depend from independent Claim 2, which is submitted to be patentable over the cited art. When the recitations of Claims 13-16 are considered in combination with the recitations of Claim 2, Applicants submit that Claims 13-16 likewise are patentable over the cited art.

Claims 17-20 depend from independent Claim 5, which is submitted to be patentable over the cited art. When the recitations of Claims 17-20 are considered in combination with the recitations of Claim 5, Applicants submit that Claims 17-20 likewise are patentable over the cited art.

In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully Submitted,



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